

Find the inverse

$$\begin{aligned} \textcircled{1} \quad y &= 3x - 4 \\ x &= 3y - 4 \\ +4 \quad +4 \\ \hline x+4 &= 3y \\ \frac{x+4}{3} &= \frac{3y}{3} \end{aligned}$$

$$\boxed{\frac{x+4}{3} = y}$$

Solve for x

$$\textcircled{3} \quad 2^x = 2^4$$

$$x = 4$$

One-to-one

$$\textcircled{5} \quad 10^x = 7$$

$$x = 0.8451$$

$$\textcircled{2} \quad y = (3x-2)^2 + 3$$

$$x = (3y-2)^2 + 3$$

$$x-3 = (3y-2)^2$$

$$\pm\sqrt{x-3} = 3y-2$$

$$\pm\sqrt{x-3} = 3y-2$$

$$\pm\frac{\sqrt{x-3}+2}{3} = \frac{3y}{3}$$

$$\boxed{\pm\frac{\sqrt{x-3}+2}{3} = y}$$

$$\textcircled{4} \quad 4^3 = 4^{2x-5}$$

$$3 = 2x - 5$$

$$8 = 2x$$

$$\boxed{x = 4}$$

$$\textcircled{6} \quad 10^x = 47$$

$$x = 1.6721$$

Inverse Functions

Equations

Switch the x + y
and solve for y

$$y = 3x + 2$$

$$x = 3y + 2$$

$$\begin{array}{cc} -2 & -2 \end{array}$$

$$\frac{x-2}{3} = \frac{3y}{3}$$

$$\frac{x-2}{3} = y$$

Tables

Switch the x + y

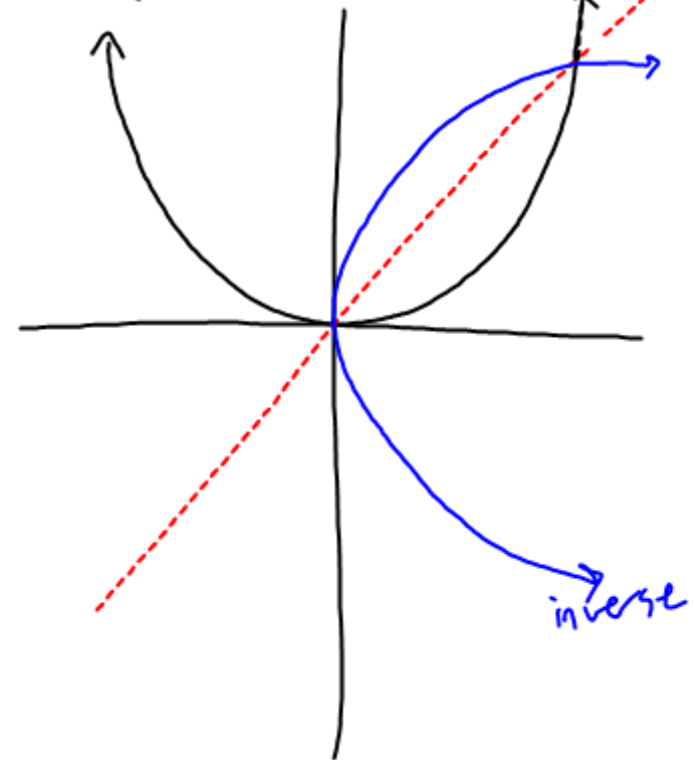
x	y
1	4
2	6
3	8
4	10

inverse

x	y
4	1
6	2
8	3
10	4

Graphs

Switch the x + y
(reflect over $y=x$)



$$y = 10^x$$

x	y
0.8451	7
1	10
1.6721	47
2	100
3	1000
4	10,000

$$y = \log x$$

Inverse

x	y
7	0.84509804
10	1
47	1.672097858
100	2
1000	3
10000	4

$$10^x = 7$$

$$1.67209 \dots$$

Solve for x

$$10^x = 7 \quad x = 0.84509804$$

$$10^x = 47 \quad x = 1.672097858$$

$$10^x = 5 \quad x = 0.6989770043$$

$$10^x = 1000 \quad x = 3$$

Change of base property

$$7^x = 47$$

$$\left(10^{0.84509804}\right)^x = 10^{1.672097858}$$

$$10^{0.84509804x} = 10^{1.672097858}$$

$$0.84509804x = 1.672097858$$

$$x = \frac{1.672097858}{0.84509804} = \frac{\log 47}{\log 7}$$

$$x \approx 1.97858447$$

① $7^x = 47$

base \nearrow \nwarrow exponent x \nwarrow Answer 47

Exponential Form

② $\log_7 47 = x$

base \nearrow \nwarrow Answer 47 \nwarrow Exponent x

Logarithmic form

③ $x = \frac{\log 47}{\log 7}$

Exponent x \nwarrow Answer 47 \nwarrow base 7

Change of base Property

Write in exponential form and solve for x

$$\textcircled{1} \quad x = \log_5 125$$

$$5^x = 125$$

$$x = \frac{\log 125}{\log 5} = 3$$

$$\textcircled{2} \quad \log_4 100 = x$$

$$4^x = 100$$

$$x = \frac{\log 100}{\log 4} \approx 3.321928095$$

Write in logarithmic form and solve for x

$$\textcircled{3} \quad 3^x = 16$$

$$\log_3 16 = x$$

$$x = \frac{\log 16}{\log 3} \approx 2.523719014$$

$$\textcircled{4} \quad 8^x = 4$$

$$\log_8 4 = x$$

$$x = \frac{\log 4}{\log 8} \approx 0.\overline{66}$$

Sect. 8.3 # 6-13(6), 14-20, 53-61(6), 64-70

Sect. 8.5 # 1-11 (odd)

$$\begin{aligned}\textcircled{14} \quad \log_2 16 &\Rightarrow \log_2 16 = x \\ 2^x &= 16 \\ x &= \frac{\log 16}{\log 2}\end{aligned}$$

$$\textcircled{20} \quad \text{No Solution} \\ \log(x), x > 0$$

$$\begin{aligned}\textcircled{54} \quad \log 0.0001 &= -4 \\ 10^{-4} &= 0.0001\end{aligned}$$